

DEFENSE SYSTEMS MANAGEMENT COLLEGE ACQUISITION POLICY DEPARTMENT

TEACHING NOTE

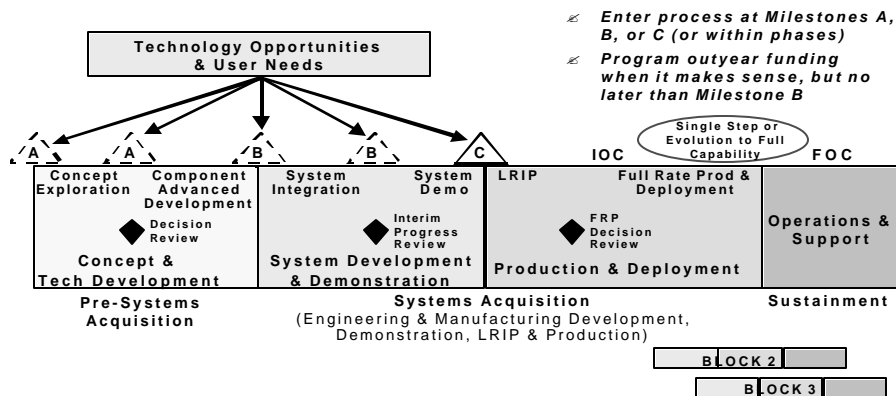
Defense Acquisition Process Milestones and Phases: A Summary of the Revised 5000 Series

LTC Chris Fry, 2 July 2001

The Department of Defense (DoD) acquisition process recognizes both user needs and technological opportunities as viable means to enter the systems acquisition process. The acquisition process is divided into phases separated by formal decision points called milestones. Within phases, formal decision points are called Decision Reviews (DRs) or Interim Progress Reviews (IPRs). The result of a successful milestone review is a decision by the Milestone Decision Authority (MDA) to proceed into the next acquisition phase. The result of a successful DR or IPR is to proceed with work within an acquisition phase.

This acquisition process is described in DoD Instruction 5000.2, *Operation of the Defense Acquisition System*. This instruction describes the process that applies to all acquisition programs. DoD Regulation 5000.2-R, *Mandatory Procedures for Major Defense Acquisition Programs (MDAPs) and Major Automated Information System (MAIS) Acquisition Programs*, contains operating procedures to implement DoDI 5000.2 for major defense acquisition programs (Acquisition Category (ACAT) I) and major automated information systems acquisition programs (ACAT IA). Selected provisions of DoD 5000.2-R also apply to nonmajor acquisition programs (ACATs II and III). (The primary differences in the management of major and nonmajor acquisition programs are the level of milestone decision authority (MDA), and the applicability of statutory requirements). This paper summarizes the acquisition process and, where appropriate, highlights requirements unique to specific ACATs. The following diagram illustrates the process. However, milestones and phases may be eliminated, or otherwise tailored, depending on the technical readiness level of the particular program as explained below.

The DoDI 5000.2 Model Milestones and Phases



The Defense Acquisition System is a continuum composed of three activities with multiple paths into and out of each activity. The activities are pre-system acquisition (science and technology opportunities and user needs – requirements generation, and concept development and demonstration), systems acquisition (development, demonstration, procurement/production and deployment of systems), and sustainment (logistics support throughout the system’s life and eventual disposal at the end of the system’s useful life). The activities are divided into phases (e.g., System Development and Demonstration), and the phases into work efforts (e.g., System Integration) as shown graphically above.

There are two primary paths to enter the acquisition process: 1) the determination and documentation of a mission need and the decision to act on that mission need at a Milestone A, followed by Concept Exploration (CE) and/or Component Advanced Development, or 2) a technological opportunity demonstrated in the form of an Advanced Technology Demonstration (ATD), Advanced Concept Technology Demonstration (ACTD), or a joint or service-specific Experiment resulting in a Milestone A, B, or C decision depending upon the technological maturity of the system demonstrator.

Pre-Systems Acquisition Activity

Pre-system acquisition is composed of studies and analysis in support of user needs, science and technology efforts, and concept development work specific to the development of a materiel solution to an identified and validated need.

User Needs. Mission needs are identified through mission area analysis of current and projected capabilities. These assessments are conducted by Military Departments, Defense Agencies, Unified Commands, Office of the Secretary of Defense (OSD), and the Joint Staff. Some examples of warfighting mission areas include: Army - Land Warfare and Fire Support; Navy - Joint Littoral Warfare and Strategic Sealift; Marine Corps - Amphibious Assault and Air Warfare; Air Force - Air Warfare and Strategic Offense. As a result of this process, warfighting deficiencies may be uncovered.

A mission need analysis is conducted to determine if a non-materiel solution, such as a change in organization, tactics, doctrine or training, could remedy the deficiency. If a non-materiel solution cannot satisfy the mission need, and a materiel solution is required, a Mission Need Statement (MNS)¹ is written to document the need/deficiency.

MNS are reviewed, validated and approved by an “operational validation authority.” Validation confirms that the need exists and cannot be resolved by a non-materiel solution. Approval is the formal sanction of the need described in the requirements documentation and certifies that the documentation has been subject to the process established by the DoD 5000 series. The operational validation authority also assesses joint Service potential, and sends

¹ Chairman of the Joint Chiefs of Staff Instruction (CJCSI) 3170.01B, “Requirements Generation System”, and CJCSI 6212.01B, “Interoperability and Supportability of National Security Systems, and Information Technology Systems”, are the basic references for requirements generation, to include certification, review, validation, and approval of MNSs, Capstone Requirements Documents (CRDs) and Operational Requirements Documents (ORDs).

approved MNSs to the appropriate acquisition milestone MDA. The MDA conducts a Milestone A review to determine if concept studies are warranted.

Chiefs of the Military Services, Heads of Defense Agencies, and Commanders-in-Chief of Unified commands, validate and approve their own MNS for potential non-major defense acquisition programs (ACAT II, ACAT III, and ACAT IV² programs). The Joint Requirements Oversight Council (JROC), chaired by the Vice Chairman of the Joint Chiefs of Staff, is the MNS validation and approval authority for potential MDAPs (ACAT I programs) and major automated information system (MAIS) programs (ACAT IA programs). Additionally, all automated information system (AIS) MNSs and ORDs, regardless of ACAT, must be submitted to J-8, Joint Staff for a determination of whether a JROC review is warranted.

The MDA for potential ACAT I programs is the Under Secretary of Defense for Acquisition, Technology and Logistics (USD(AT&L)). The MDA for potential ACAT IA programs is the Assistant Secretary of Defense (Command, Control, Communications, and Intelligence) (ASD(C3I)). Component Acquisition Executives (CAEs) are MDAs for potential ACAT II programs, and a Program Executive Officer (PEO) or the commander of an acquisition command would normally be the MDA for potential ACAT III or ACAT IV programs. The MDA may delegate some ACAT I and IA programs to a CAE. ACAT ID programs are retained at the USD(AT&L) level for review by the Defense Acquisition Board (DAB), as appropriate. ACAT IAM programs are retained at the ASD(C3I) level for review by Information Technology Overarching Integrated Product Team (IT OIPT). ACAT IC and ACAT IAC programs are those delegated to the Components for review.

Transition Mechanisms. There are three primary mechanisms for the transition of promising science and technology projects and concepts: ATDs, with oversight and review at the component or military service level, ACTDs, with oversight and review at the Office of the Secretary of Defense (OSD) staff level, and Experiments, both joint and service-specific, with oversight at the service or OSD level. ATDs demonstrate the maturity and potential of advanced technologies for enhancing military operational capability or cost effectiveness. ACTDs determine military utility of proven technology, and provide a means to develop the concept of operations to optimize effectiveness. Experiments develop and assess the best value-added solutions for changes to doctrine, organizational structure, training and education, materiel, leadership, and personnel to achieve significant advances in future joint operational capabilities. Entry into systems acquisition for a science and technology program is dependent upon a determination that the technology (or technologies) can be exploited in an affordable way to meet a military or business need.

At the conclusion of requirements generation and technology assessment activities, there are multiple entry points to the systems acquisition framework available to a program. The entry point, and subsequent acquisition path, is determined by the maturity of relevant technologies and the user's employment concept, and an evaluation of currently available products from the commercial and defense industrial base.

² DoD eliminated the ACAT IV category in 1996. However, the Army, Navy, and Marine Corps decided to retain this category for internal classification purposes.

Concept and Technology Development Phase.

Entrance Criteria: Validated and approved MNS; market research, as appropriate.

Milestone A: One path into systems acquisition begins with a Milestone A decision. Milestone A approval can lead to either the Concept Exploration (CE) or Component Advanced Development (CAD) within the Concept and Technology Development (C&TD) Phase. CE is appropriate when evaluation of multiple concepts is required; CAD is appropriate when the concept has been chosen, but more work is needed on key subsystems or components before a system architecture can be determined, and technologies can be demonstrated in a relevant environment. The C&TD Phase ends with the selection of a system architecture and the satisfaction of entrance criteria necessary for Milestone B, approval to enter the System Development and Demonstration Phase.

Concept Exploration: Based on a favorable assessment of the mission need by the operational validation authority, the MDA convenes a Milestone A review. The MDA will review the MNS (through the IPT process), consider possible technology issues (e.g., technologies demonstrated in ATDs) and identify possible materiel alternatives before making a Milestone A decision. As a result of a favorable Milestone A decision, the MDA issues an Acquisition Decision Memorandum (ADM) beginning CE, directing the Analysis of Multiple Concepts, designating a lead Component (as appropriate), and initiating concept studies with industry. The MDA also approves exit criteria for CE at Milestone A, and may define a minimum set of cases to be considered in the Analysis of Alternatives (AoA)³ to be conducted in CE. CE ends with the selection by the MDA (through close coordination with the user) of a preferred concept or concepts to be pursued in development.

For MDAPs, the leader of the concept development team, working with the integrated test team develops an evaluation strategy that describes how the capabilities in the MNS will be evaluated once the system is developed. This strategy is approved by the Director, Operational Test and Evaluation, and cognizant Overarching Integrated Product Team (OIPT) leader 180 days after Milestone A. Concept analysis includes environmental impacts of each alternative throughout the system's life cycle, potential mitigation of adverse impacts and how the environmental impacts and proposed mitigation measures affect alternatives, schedules and program costs. An Analysis of Alternatives is used to facilitate comparisons of feasible concepts. Other activities resulting in program information elements, such as the preparation of the acquisition strategy, Operational Requirements Document (ORD), Acquisition Program Baseline (APB), and Test and Evaluation Master Plan (TEMP), may be conducted during CE, depending on the entrance criteria specified for the next program decision point⁴.

³ AoA refers to a study of competing system concepts that assesses the cost and operational benefit of each alternative when compared with the others and the baseline (fielded) system. For AIS programs, a "Functional Economic Analysis" (FEA) may provide most of the information needed for an AoA. (See Defense Acquisition Deskbook, part 2.4.5).

⁴ A complete list of statutory and regulatory program information elements, by milestone and decision point, is contained in DoDI 5000.2, Enclosure 3, Tables 1 and 2.

Decision Review (Component Advanced Development (CAD)): A program may enter CAD directly after a successful Milestone A, or as a result of a successful Decision Review at the end of the CE phase. It is appropriate for a program to enter CAD when a concept exists for the needed capability, but a system architecture has not yet been determined. This effort is intended to reduce risk related to components and subsystems that have been demonstrated only in a laboratory environment, and to determine the appropriate set of subsystems to be integrated into the eventual full system. This work effort will normally be funded only for advanced technology development work, that is, work funded by Research, Development, Test and Evaluation Appropriation funds (budget activity 3). The work effort is guided by the approved MNS, but during this phase the user community will also complete an initial ORD. A program exits CAD when a system architecture has been developed and the component technology has been demonstrated in a relevant environment, or the MDA decides to end the effort. CAD is normally followed by entry into the System Development and Demonstration (SD&D) Phase.

Systems Acquisition Activity

Systems acquisition is the process of developing concepts into producible and deployable products that provide capability to the user. The concept or concepts to exploit in systems acquisition are based on an AoA to determine the most effective method for satisfying the military need. The actual AoA is accomplished prior to the start of Systems Acquisition, either in Concept and Technology Development, or during the demonstration of technology opportunities, i.e., an ATD, ACTD or Experiment. The DoD Component (or Principal Staff Assistant for MAIS programs) responsible for the mission area in which a deficiency or opportunity has been identified, but not the Program Manager, will normally prepare the AoA (The PM and PM's representatives may participate in the analysis).

Generally, use or modification of systems or equipment that DoD components already own is more cost and schedule effective than acquiring new materiel. If existing U.S. military systems or other on-hand materiel cannot be economically used or modified to meet the operational requirement, an acquisition program may be justified. Decision makers will follow the following hierarchy of alternatives: (1) the procurement (including modification) of commercially available domestic or international technologies, systems or equipment, or the additional production (including modification) of previously developed U.S. military systems or equipment, or Allied systems or equipment; (2) cooperative development program with one or more Allied nations; (3) new joint Component or Government Agency development program; and (4) a new Component-unique development program. Important in this evaluation process for new or modified systems are considerations for interoperability and supportability with existing and future components or systems.

System Development and Demonstration Phase. The purpose of this phase is to develop a system, reduce program risk, ensure system supportability and design for producibility, assure program affordability, and demonstrate system integration, interoperability and utility. Development is aided by the use of simulation-based acquisition and test and evaluation, and guided by a system Acquisition Strategy and Test and Evaluation Master Plan. All modeling, simulation, test and evaluation activities are integrated and executed by a Test and Evaluation

Integrated Product Team. This phase can be entered directly out of technology opportunity and user need activities (i.e., from Pre-Systems Acquisition activities), or from CE.

Entrance Criteria: Entrance into System Development and Demonstration (SD&D) depends on the maturity of the technologies to be used, validated requirements (including urgency of need), and program affordability. Unless some other factor is overriding in its impact, the maturity of the technology will determine the path to be followed by the program. The determination of technology maturity is made by the DoD Component Science and Technology (S&T) Executive. For MDAPs, this determination is reviewed by the Deputy Under Secretary of Defense (DUSD) (S&T). For entry into this phase, technology must have been demonstrated in a relevant environment (e.g., a first flight), and preferably in an operational environment (using one of the transition mechanisms, i.e., an ATD, ACTD, or joint or service-specific Experiment).

Milestone B: The entry point for the System Development and Demonstration Phase is Milestone B (either at System Integration or System Demonstration). There will only be one Milestone B per program, or evolutionary block upgrade. Milestone B is normally the program initiation point for an acquisition program. To secure a favorable Milestone B decision, key program information elements must be available to include an approved ORD; an independent technology assessment; a system threat assessment; an AoA; results of any Early Operational Assessments, test and evaluation or demonstration activities; an affordability assessment; an APB; an Acquisition Strategy; a Program Protection Plan; a TEMP; and a C4I Support Plan⁵. At Milestone B, the MDA will approve the Acquisition Strategy, APB, low rate initial production quantities, where applicable, exit criteria for System Development and Demonstration (and exit criteria for an Interim Progress Review, as necessary). A waiver⁶ for statutorily required Full-up Live Fire Test and Evaluation (LFT&E) would also be approved at this milestone, if applicable, if not already granted previously.

The Acquisition Strategy at this milestone must define the approach to achieving the full capability required by the user in the ORD. Two approaches are possible, single step and evolutionary (evolutionary is preferred, but may not be the optimal approach for every program). A “single step” acquisition strategy attempts to deliver the final system which will meet the user’s requirements at one point in time. Evolutionary acquisition attempts to deliver an initial capability with the explicit intent of delivering updated or improved capability in the future to the warfighter. The evolutionary approach is particularly useful if software is a key component of the system. For both single-step and evolutionary approaches, software development and integration will follow an iterative spiral development process in which continually expanding software versions are based on learning from earlier development. The ORD must contain time phased requirements to support an evolutionary acquisition approach. For MAISs, the MDA may not grant Milestone B approval until the Component Head or designee certifies to the DoD

⁵ A complete list of statutory and regulatory program information elements, by milestone and decision point, is contained in DoDI 5000.2, Enclosure 3, Tables 1 and 2. The information requirements for those programs requesting program initiation at decision points earlier than, or later than, MS B must meet the information requirements for MS B, and also the information requirements for that particular decision point, as directed by the MDA.

⁶ The MDA may grant a waiver to *full-up* system level LFT&E if it is deemed unreasonably expensive and impractical. LFT&E at the component and subsystem level, supplemented by modeling and simulation, is still required.

CIO that the system is being developed in accordance with the Clinger-Cohen Act (Divisions D and E of the 1996 National Defense Authorization Act).

System Integration: A program enters System Integration when it has a system architecture, but has not yet completed integration of all the subsystems into a complete system. The work effort in Systems Integration is guided by an approved ORD, and is intended to integrate all subsystems thus reducing system-level risk. A program exits System Integration when the integration of the system has been demonstrated in prototypes (e.g., first flight, interoperable data flow across systems), a system configuration has been documented, the MDA determines a factor other than technology justifies program progress, or the MDA decides to end the effort. This effort will normally be followed by System Demonstration after an Interim Progress Review by the MDA (or person designated by the MDA).

Interim Progress Review (IPR): The purpose of an IPR is to confirm the program is progressing within the phase as planned, or to adjust the plan to better accommodate progress made to date or changed circumstances, or both. If adjustment involves changing the acquisition strategy, the change must be approved by the MDA. No information is specifically required for this review other than that required by the MDA, e.g., exit criteria.

System Demonstration: The program will normally enter System Demonstration (SD) when it has demonstrated the system in prototype articles. Work effort in SD is intended to demonstrate the ability of the system to operate in a useful way consistent with the approved ORD. SD ends when the system has been demonstrated in its intended environment using engineering development models (i.e., advanced prototypes that are near production representative) or integrated commercial items, the system meets validated requirements, industrial capabilities to produce the system are confirmed available, and the system meets the exit criteria.

Production and Deployment Phase.

Entrance Criteria: Approval to enter this phase (at Milestone C) depends on the following criteria being met: 1) Technology maturity (with independent technology assessment), to include system and mission area architectures, as appropriate, demonstrated system integration or demonstrated commercial products in a relevant environment, with no significant manufacturing risks, 2) approved ORD, 3) acceptable interoperability, 4) acceptable operational supportability, 5) compliance with the DoD Strategic Plan, 6) demonstration that the system is affordable throughout the life cycle, optimally funded, and properly phased for rapid acquisition, and 7) acceptable information assurance, to include information assurance detection and recovery.

Milestone C:⁷ The purpose of this milestone is to authorize entry into low-rate initial production, into production or procurement (for systems that do not require low-rate production) or into limited deployment for MAIS or software-intensive acquisition programs with no production components. For MAIS, the MDA shall approve, in coordination with the DOT&E, the quantity and sites for a limited deployment for Initial Operational Test and Evaluation (IOT&E).

⁷ A complete list of statutory and regulatory program information elements, by milestone and decision point, is contained in DoDI 5000.2, Enclosure 3, Tables 1 and 2.

Low-Rate Initial Production: This effort is intended to complete development, especially manufacturing development, to ensure adequate and sufficient manufacturing capability is available. LRIP provides production configured or representative articles for IOT&E, establishes an initial production base, and provides for an orderly ramp-up to full rate production. LRIP quantities are effectively capped at 10 % of the total acquisition quantity. If the MDA for an MDAP approves an LRIP quantity in excess of 10%, it must be explained in the next Selected Acquisition Report (SAR) for the program. For DOT&E Oversight Programs, the quantity of LRIP articles allocated for IOT&E or LFT&E must also be approved by the DOT&E. For nonmajor systems the head of operational test agency will perform this function. LRIP quantities, to include those allocated for IOT&E, are first approved at the program initiation milestone, normally Milestone B. Additionally, statutorily required IOT&E and LFT&E must be completed, and appropriate reports submitted by the DOT&E to Congress, before the program may proceed beyond low-rate initial production. The approval to proceed beyond low-rate initial production is obtained at the Full Rate Production Decision Review. LRIP is not applicable to AISs or software intensive systems with no developmental hardware; however, a limited deployment phase may be applicable.

Full Rate Production Decision Review (FRPDR): After a review of key program information elements, to include cost and manpower estimates, C4I interoperability and supportability certification, the acquisition strategy, APB, test reports from IOT&E and LFT&E (as appropriate), program peculiar issues, and submission of the BLRIP and LFT&E reports for applicable programs, the MDA may approve the program for full rate production. The Full Rate Production Decision Review ADM will approve the acquisition strategy, the APB, exit criteria (when appropriate) and provisions for post-deployment performance. A revised SAR will also be submitted.

Full Rate Production and Deployment: After a favorable FRPDR, the system is produced and fielded. Key activities include the attainment of system Initial Operational Capability (IOC) and Full Operational Capability (FOC).

Sustainment Activity

Operations and Support Phase.

Sustainment: Sustainment includes all elements necessary to maintain the readiness and operational capability of deployed systems. It generally includes such items as supply, maintenance, transportation, data management, systems engineering, configuration management, and training, among others. Follow-on operational test and evaluation (FOT&E) may be conducted to confirm that deficiencies in operational effectiveness, suitability, survivability, or interoperability have been remedied, as appropriate.

Evolutionary Sustainment: Sustainment strategies must be capable of supporting evolutionary acquisition strategies, particularly during subsequent block modifications, upgrades, or recapitulation actions, and be flexible enough to cope with the full scope of operational support, e.g., supply, maintenance, transportation, or environmental considerations. This entails evolving the sustainment strategy to emphasize the use of performance requirements, or conversion to

performance requirements, especially during reprocurement of components, spares, subsystems, and systems after the initial production contract.

Disposal. At the end of its useful life, the system is withdrawn from service for demilitarization and disposal. The PM addresses demilitarization and disposal requirements in the acquisition strategy to insure that sufficient information exists so that disposal may be carried out in accordance with all statutory and regulatory requirements related to health, safety and the environment. For many systems, the Defense Reutilization and Marketing Office executes the PM's strategy and demilitarizes and disposes of items, as assigned.